TITLE: *IN VITRO* SYNERGISM BETWEEN 2,2-DIBROMO-3-NITRYLOPROPIONAMIDE AND OXACILLIN AGAINST METHICILLIN-RESISTANT S*taphylococcus aureus*

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ABSTRACT:

Methicillin-resistant *Staphylococcus aureus* (MRSA) are Gram-positive that colonize skin and mucous membranes, depending on the patient's immune status may cause can causes localized infections such as folliculitis, cellulitis and serious infections such as pneumonia, necrotizing fasciitis and septicemia. It is estimated that about 14% of infections caused by microorganisms are caused by *S. aureus* and of these 43.7% correspond to MRSA. It presents resistance to methicillin and all β-lactam antimicrobials, limiting the treatment of infections. In view of the limited treatment of infections caused by MRSA and the increase of microbial resistance, the aim of this study was to evaluate te antibacterial activity and the *in vitro* interaction between oxacillin and DBNPA against 10 MRSA strains. Antibacterial activity of DBNPA was initially determined against nine strains of MRSA of clinical origin and one standard strain *American Type Culture Collection* MRSA ATCC 33591 (n=10) by microdilution in broth. The interaction study between oxacillin and DBNPA was determined using the checkerboard method in 10 MRSA strains. Fraction Inhibitory Index (FICi) was used as the criteria to evaluate the synergistic effect. All strains showed oxacillin resistance profile, observed by the minimum inhibitory concentration (MIC) that presented values ranging from 32 to 1024 $\mu g.mL^{-1}$. DBNPA showed activity against all strains tested with MIC values ranging from 64 to 128 $\mu g.mL^{-1}$. The synergistic effect between oxacillin and DBNPA was observed among all strains tested. The FICi values ranged from 0.126 to 0.375. The reduction percentage of oxacillin MIC was superior or equal to 87.5%. DBNPA in combination with oxacillin acts synergistically and has a high potential for reducing the MIC of this antibiotic against MRSA strains.

Keywords: DBNPA, oxacillin, MRSA, synergistic effect

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